

What Is Claimed Is:

1. An implant comprising:
 - a shaft;
 - a holding element connected with the shaft, wherein the holding element comprises a recess with a U-shaped cross section for receiving a rod, the recess forming two free legs having at one end thereof an inner thread;
 - a closure element for fixation of the rod inserted into the U-shaped recess, the closure element having an outer thread cooperating with the inner thread of the legs; and
 - an abutment cooperating with the closure element to limit a tilting of the closure element about the rod at the time of final tightening of the closure element in the holding element.
2. The implant according to claim 1, wherein the closure element comprises a lower side facing the rod and the abutment is a support surface for a section of the lower side of the closure element.
3. The implant according to claim 2, wherein the U-shaped recess has a bottom and the rod has a diameter (D), a distance (A) between the bottom of the U-shaped recess to the support surface being smaller than the diameter (D) of the rod.
4. The implant according to claim 3, wherein the distance (A) is smaller than the diameter (D) by an amount from about 1% to about 7.5% of the diameter (D).
5. The implant according to claim 1, wherein the abutment is an inward projecting surface on the inside of the free legs of the holding element.

6. The implant according to claim 1, wherein the shaft and the holding element are connected monoaxially.

7. The implant according to claim 6, wherein the shaft and the holding element are formed in one piece.

8. The implant according to claim 1, wherein the shaft has a head at one end that is polyaxially connected to the holding element,

wherein the implant further comprises a pressure element having an end facing the closure element for acting upon the head to fix an angular position of the shaft relative to the holding element, and

wherein the abutment is provided at the end of the pressure element.

9. The implant according to claim 8, wherein the pressure element comprises a second U-shaped recess with a second bottom corresponding to the recess of the holding element, the second U-shaped recess forming third and fourth free legs having a free end in a plane and wherein the abutment is formed by the free end.

10. The implant according to claim 9, wherein the rod has a diameter (D) and wherein a distance (A) from the second bottom of the second U-shaped recess to the free end of the pressure element is smaller than the diameter (D) of the rod.

11. The implant according to claim 1, wherein the inner thread of the legs and the outer thread of the closure element are formed as a thread selected from the group consisting of a metric thread, a saw tooth thread, a thread

having a load flank having a negative angle, and a flat thread.

12. The implant according to claim 1, wherein the shaft comprises a bone thread or a bone hook.

13. A method for fixing a rod relative to a bone, the method comprising:

providing an implant comprising:

a shaft;

a holding element connected with the shaft, wherein the holding element comprises a recess with a U-shaped cross section for receiving a rod, the recess forming two free legs having at one end thereof an inner thread;

a closure element for fixation of the rod inserted into the U-shaped recess, the closure element having an outer thread cooperating with the inner thread of the legs; and

an abutment cooperating with the closure element to limit a tilting of the closure element about the rod at the time of final tightening of the closure element in the holding element;

connecting the implant to the bone;

positioning the rod in the implant; and

fixing the rod in the implant.

14. The method according to claim 13, wherein the implant is a polyaxial screw and the method further comprises adjusting the angular position of the polyaxial screw element relative to the holding element and adjustment of the rod.

15. The method according to claim 13, wherein the implant is a polyaxial screw comprising a head with a recess in the head and the method further comprises:

assembling the polyaxial screw and holding member of the implant;

inserting a pressure member into the holding member;

screwing the polyaxial screw into the bone using a diving tool that dives the screw by means of the recess in the head; and

after positioning the rod, fixing the rod by tightening the closure element in the holding element.

16. The method according to claim 13, wherein the fixing step includes tightening of the closure element by applying strong forces to tilt the closure element about the rod until stopped against further forward movement by the abutment.

17. Pressure element for use in a polyaxial bone screw, the polyaxial bone screw comprising

a screw element having a shaft with a bone thread and a head,

a holding element for holding the head, the holding element comprising

a first recess with a U-shaped cross section for receiving a rod having a diameter (D), the first recess having a bottom and forming two free legs having at one end thereof an inner thread,

the pressure element being substantially cylindrically-shaped with a first end and a second end and comprising

a second recess with U-shaped cross section at the first end, the second recess corresponding to said first recess in said holding element, the second recess having a

second bottom and forming third and fourth free legs for receiving the rod,

wherein a distance (A) from the second bottom of the second U-shaped recess to the free end of the third and fourth legs is smaller than the diameter (D) of the rod.

18. Pressure element according to claim 16, comprising a third recess at the second end which is shaped such as to at least partly encompass the head of the screw element.

19. Pressure element according to claim 16, comprising a coaxial bore for inserting a screw-in tool to cooperate with the head of the screw element.

20. The pressure element according to claim 16, wherein the distance (A) is smaller than the diameter (D) by an amount from about 1% to about 7,5% of the diameter (D).